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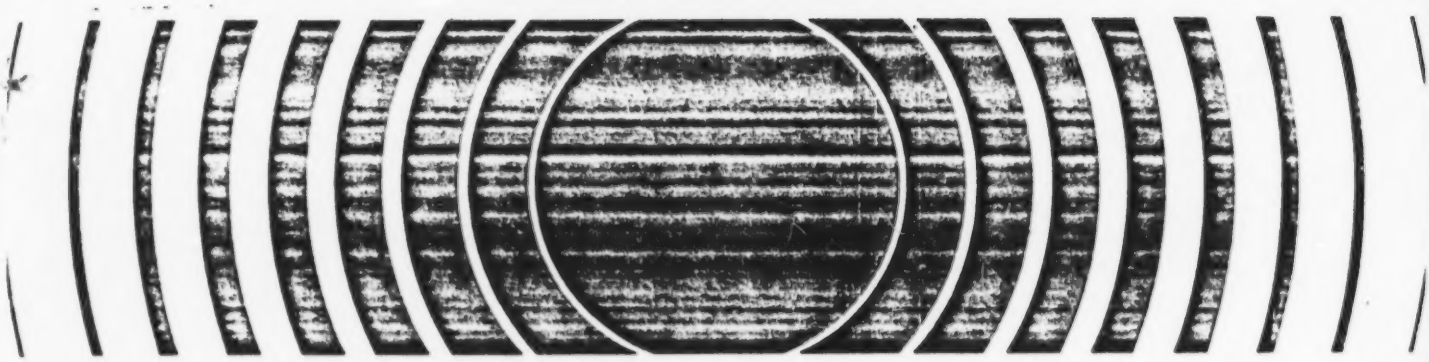

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This report revises estimates of population exposure to external natural background made by D. T. Oakley in 1972. The revisions include more recent estimates of dose equivalents from cosmic rays, use of 1970 U.S. census data, and corrections for building shielding and for self-shielding in the body. The dose equivalents calculated are those from cosmic rays and terrestrial radiation, and do not include doses from natural radioactive materials in the body.

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POPULATION EXPOSURE TO EXTERNAL NATURAL RADIATION BACKGROUND IN THE UNITED STATES

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and
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April 1981

Surveillance and Emergency Preparedness Division
Office of Radiation Programs
U. S. Environmental Protection Agency
Washington, D.C. 20460

ABSTRACT

This report revises estimates of population exposure to external natural background made by D. T. Oakley in 1972. The revisions include more recent estimates of dose equivalents from cosmic rays, use of 1970 U.S. census data, and corrections for building shielding and for self-shielding in the body. The dose equivalents calculated are those from cosmic rays and terrestrial radiation, and do not include doses from natural radioactive materials in the body.

The revised data, not including shielding corrections, give a mean dose equivalent of 71 millirems per year to the U.S. population. Twenty percent of the population receive less than 50 millirems per year, seventy percent less than 82 millirems per year, and ninety-five percent less than 108 millirems per year. These dose equivalents, which correspond approximately to skin dose equivalents out-of-doors, are useful for comparison with other exposures measured or stated without shielding corrections.

The revised data, including shielding corrections, give a mean dose equivalent of 53 millirems per year to the United States population. Twenty percent receive dose equivalents less than 38 millirems per year, seventy percent less than 58 millirems per year, and ninety-five percent less than 76 millirems per year. These dose equivalents correspond approximately to those received by internal organs, such as gonads or red marrow. They are useful for estimating dose equivalents received by these organs and for estimating population health risks from natural radiation.

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Introduction and Summary

Man's exposure to natural background radiation is often used as a basis of comparison for exposures to man-made sources of ionizing radiation (NCRP75). This technical note revises estimates of the U.S. population dose equivalent from cosmic and natural terrestrial radiation as reported by Oakley in 1972 (Oa72). This revision uses: 1) newer estimates of cosmic-ray dose equivalents in the United States (NCRP75), 2) 1970 U.S. census data rather than 1960 data, 3) corrections for shielding by building structures, and 4) corrections for self-shielding in the body.

The values without shielding corrections are most useful for comparison with other measurements of unshielded radiation doses or exposures in the outdoor environment. The values with a shielding correction are useful for estimating the actual dose equivalent received by internal organs or calculating the health risks from background radiation. Johnson et al. (Jo81) have used these values, with shielding corrections, to prepare a contour map of the ambient natural radiation levels in the United States.

Oakley's Work

In 1972 Oakley (Oa72) reported estimated dose equivalents to people in specified locations in the United States and average dose equivalents to the total U.S. population. Oakley estimated the dose equivalent from cosmic rays as a function of the elevation above sea level, which is the primary determinant of cosmic-ray dose equivalents in the United States. His terrestrial dose equivalents were estimated from aerial survey measurements.

To calculate the frequency distribution of dose equivalents in the United States, Oakley used Census Bureau data on populations in urbanized and nonurbanized areas. For each population segment, he calculated the appropriate cosmic-ray dose equivalent from the altitude and the appropriate terrestrial dose equivalent from the aerial survey measurements. For areas where no aerial survey measurements were available, he estimated the distribution of terrestrial dose equivalents from the frequency distribution of the available aerial survey dose equivalent data.

Cosmic Radiation

The National Council on Radiation Protection and Measurements (NCRP75) evaluated natural background radiation in the United States.

They accepted Oakley's natural terrestrial values, but used different cosmic-ray dose equivalents.

The NCRP used lower cosmic-ray ionizing component doses based on three sets of data (Lo66, Sh66, Li75) rather than the eight values (So60, Ka63, Lo66, Sh66, Oh69, Ge70. O'Br70, Ye70) used by Oakley. They also used newer cosmic-ray neutron measurements and a lower neutron quality factor.

We based our revised estimates of cosmic-ray dose equivalent to the U.S. population on the NCRP long-term average cosmic-ray dose equivalent rates at various altitudes. To facilitate our reanalysis, we described the NCRP dose equivalent graph for altitudes from 0 to 2.5 kilometers by the equation:

$$D = 28.9 + 7.45x + 1.69x^2 + 1.21x^3 + 0.193x^4 \quad (1)$$

where x is the altitude in kilometers and D is the corresponding average dose equivalent rate in millirem per year (mrem/y).

Table A-1 of Appendix A shows the cosmic-ray dose equivalents calculated from equation (1), the natural terrestrial radiation dose equivalents (Oa72), and the sum of cosmic-ray and natural terrestrial dose equivalents, for all 349 population regions in the United States. These values were combined with 1970 U.S. census data to give the distribution of natural radiation dose equivalent in the United States, uncorrected for shielding. The mean dose equivalent was 71 mrem/y. Twenty percent of the population received less than 50 mrem/y, seventy percent less than 82 mrem/y, and ninety-five percent less than 108 mrem/y. Figure 1 shows the frequency distribution of dose equivalents. Table 1 gives the average values of these uncorrected dose equivalents for each state.

Shielding Corrections

The estimates in Table A-1 represent the dose equivalents that would be received outdoors by the surface tissues of a person. Dose equivalents received indoors by a person are generally reduced by attenuation by building materials. Oakley (Oa72) estimated that buildings reduced the dose equivalent from terrestrial sources by 20 percent, so that a person actually received, in surface tissues, 80 percent of the dose equivalents of Table A-1.

The NCRP (NCRP75) estimated that building materials reduced cosmic-ray dose equivalents by 10 percent, leaving 90 percent that reached a person.

Internal organs, such as gonads and red marrow, incur somewhat lower dose equivalents because of shielding by outer portions of the body. Oakley estimated a futher 20 percent attenuation, based on work by Bennett (Be70), so that the terrestrial dose equivalent received by internal organs is 0.8 x 0.8, or 0.64 (64 percent) of the values given in Table A-1. The attenuation of cosmic-ray radiation in the body is small and was taken into account by the NCRP in their cosmic radiation estimates (NCRP75). The actual cosmic-ray dose equivalent received by internal organs is therefore 90 percent of the Table A-1 values.

Table A-2 in Appendix A gives the values of cosmic-ray and natural terrestrial radiation dose equivalents, and their sums, for the same 349 population regions used by Oakley. Corrections for building and body shielding are included. The mean dose equivalent was 53 mrem/yr; twenty percent of the population received less than 38 mrem/yr; seventy percent less than 58 mrem/yr; and ninety-five percent less than 76 mrem/yr.

Table 1 includes the average dose equivalent values with shielding corrections for each state. Figure 2 presents the cumulative frequency for the uncorrected and shielding-corrected total dose equivalents from natural radiation. Figure 3 gives the frequency distribution of the corrected dose equivalents.

Discussion

About half the difference between the cosmic-ray data in the original Oakley work and those in the NCRP report originates from the NCRP selection of three sets of data, rather than the eight sets used by Oakley. Another portion comes from the use of newer neutron flux measurements and a revised quality factor. The remainder originates in an NCRP decision that the absorbed dose rate in air from cosmic ray muons and fast electrons could be used as the absorbed dose rate within the body. NCRP stated that the small difference in stopping power between air and tissue was approximately compensated by attenuation in the body. To the extent that this is an oversimplification, our cosmic-ray dose equvalents in tissue, obtained from the NCRP data, may be too low by two or three millirem per year.

Table 1. Average Dose Equivalents by State

State	1970 Population	Mean Elevation (meters)	Dose Equivalent(mrem/y) (Unshielded) Cosmic	Terr.	Total	Dose Equivalent(mrem/y) (Shielded) Cosmic	Terr.	Total
Total	203,235,297		30.9	40.0	70.8	27.8	25.6	53.4
Alabama	3,444,164	154	30.1	35.2	65.4	27.1	22.5	49.7
Alaska	302,166	76	29.5	45.6	75.1	26.6	29.2	55.7
Arizona	1,772,479	628	35.0	45.6	80.6	31.5	29.2	60.7
Arkansas	1,923,295	191	30.5	29.8	60.4	27.5	19.1	46.6
California	19,953,106	106	29.8	36.2	66.0	26.8	23.2	50.0
Colorado	2,207,260	1651	52.8	66.5	119.3	47.5	42.6	90.1
Connecticut	3,032,219	51	29.3	51.0	80.4	26.4	32.7	59.1
Delaware	548,106	33	29.2	31.3	60.5	26.3	20.1	46.3
D.C.	756,510	46	29.3	35.4	64.7	26.4	22.7	49.0
Florida	6,789,447	16	29.1	22.3	51.4	26.2	14.3	40.4
Georgia	4,589,574	217	30.7	40.2	70.9	27.6	25.7	53.3
Hawaii	769,911	43	29.3	45.6	74.9	26.3	29.2	55.5
Idaho	713,003	1080	40.8	45.6	86.4	36.8	29.2	65.9
Illinois	11,113,962	194	30.4	41.5	72.0	27.4	26.6	54.0
Indiana	5,193,672	222	30.7	44.9	75.6	27.6	28.7	56.3
Iowa	2,825,038	314	31.5	45.6	77.1	28.3	29.2	57.5
Kansas	2,249,079	417	32.5	45.6	78.1	29.2	29.2	58.4
Kentucky	3,219,296	234	30.8	43.5	74.3	27.7	27.8	55.6
Louisiana	3,643,188	23	29.1	22.8	51.9	26.6	14.6	40.8
Maine	993,659	104	29.7	45.6	75.3	26.8	29.2	55.9
Maryland	3,922,397	52	29.3	32.3	61.7	26.4	20.7	47.1
Massachusetts	5,689,172	56	29.4	45.2	74.6	26.4	29.0	55.4
Michigan	8,875,092	214	30.6	45.6	76.2	27.6	29.2	56.7
Minnesota	3,805,064	337	31.7	39.2	70.9	28.5	25.1	53.6
Mississippi	2,216,908	78	29.5	22.8	52.3	26.6	14.6	41.2
Missouri	4,677,403	218	30.7	44.9	75.5	27.6	28.7	56.3
Montana	694,409	1055	40.3	45.6	85.9	36.3	29.2	65.5
Nebraska	1,483,797	424	32.5	45.6	78.1	29.3	29.2	58.5
Nevada	488,736	1013	40.6	33.2	73.8	36.6	21.2	57.8
New Hampshire	737,680	177	30.3	45.6	75.9	27.3	29.2	56.5

Table 1. Average Dose Equivalents by State (continued)

State	1970 Population	Mean Elevation (meters)	Dose Equivalent(mrem/y) (Unshielded) Cosmic	Terr.	Total	Dose Equivalent(mrem/y) (Shielded) Cosmic	Terr.	Total
New Jersey	7,168,158	21	29.1	43.8	72.9	26.2	28.0	54.2
New Mexico	1,016,002	1575	50.8	52.6	103.4	45.7	33.7	79.4
New York	18,241,270	64	29.4	45.1	74.5	26.5	28.8	55.3
North Carolina	5,082,058	234	30.8	38.1	69.0	27.8	24.4	52.2
North Dakota	617,757	493	33.2	45.6	78.8	29.9	29.2	59.1
Ohio	10,652,018	231	30.8	43.8	74.5	27.7	28.0	55.7
Oklahoma	2,559,250	392	32.2	45.0	77.2	29.0	28.8	57.8
Oregon	2,091,386	190	30.5	45.6	76.1	27.4	29.2	56.6
Pennsylvania	11,793,905	158	30.2	36.3	66.5	27.2	23.2	50.4
Rhode Island	949,722	32	29.2	42.8	71.9	26.3	27.4	53.6
South Carolina	2,590,515	126	29.9	37.1	67.0	26.9	23.4	50.7
South Dakota	666,253	582	34.1	45.6	79.7	30.7	29.2	59.5
Tennessee	3,924,174	216	30.7	39.3	69.9	27.6	25.1	52.7
Texas	11,196,736	245	31.2	28.4	59.6	28.1	18.2	46.3
Utah	1,059,272	1381	46.4	45.6	92.0	41.8	29.2	71.0
Vermont	444,739	180	30.3	45.6	75.9	27.3	29.2	56.5
Virginia	4,648,490	164	30.3	33.5	63.8	27.2	21.4	48.7
Washington	3,409,173	125	29.9	45.6	75.5	26.9	29.2	56.1
West Virginia	1,744,233	385	32.2	46.7	78.9	28.9	29.9	58.8
Wisconsin	4,417,948	249	30.9	45.6	76.5	27.8	29.2	57.0
Wyoming	332,412	1768	56.0	45.6	101.6	50.4	29.2	79.6

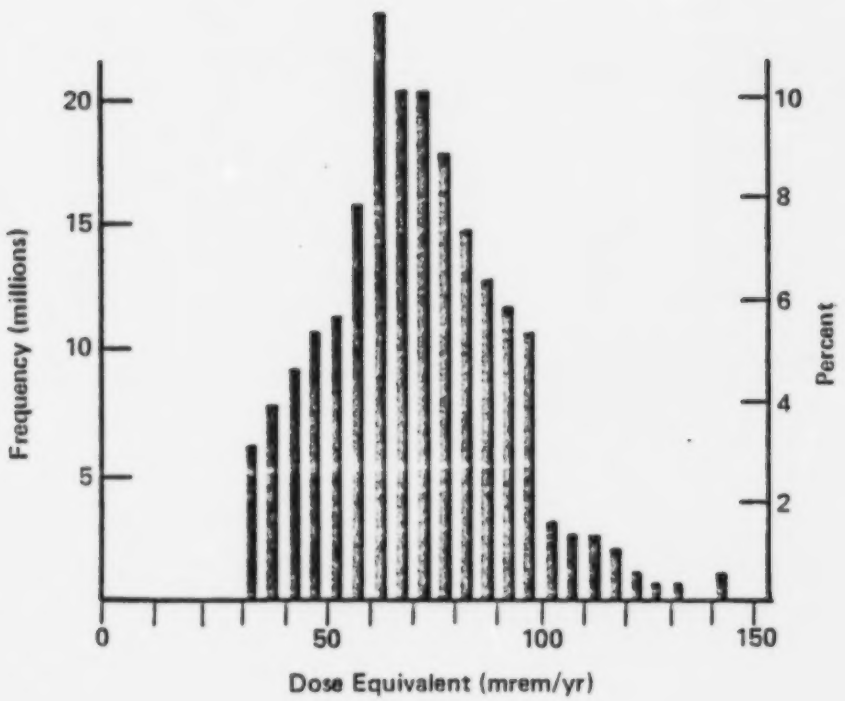

Figure 1. Frequency Distribution of Dose Equivalent in the U.S. Population (not corrected for shielding)

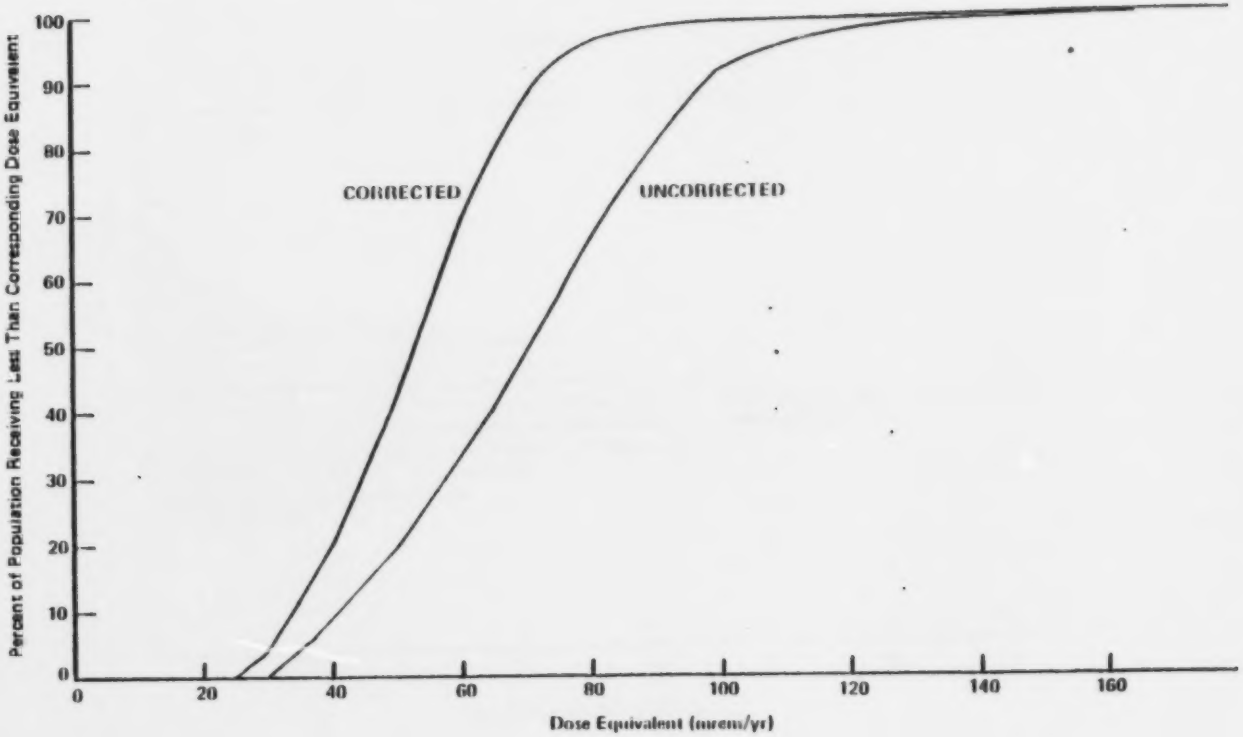

Figure 2. Cumulative Distribution of Dose Equivalent in the U.S. Population

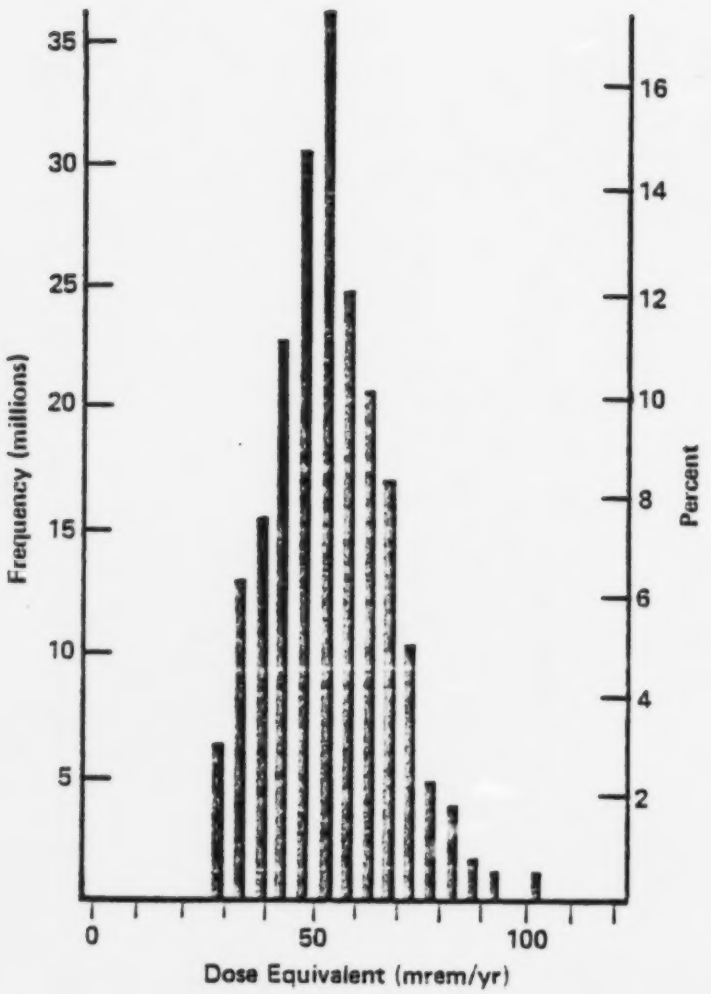

Figure 3. Frequency Distribution of Dose Equivalent in the U.S. Population (corrected for shielding)

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Appendix A

Dose Equivalent Value Tables

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
ALABAMA						
BIRMINGHAM AL	558099	183	30.4	45.6	76.0	42394
COLUMBUS AL-GA	25281	81	29.5	22.8	52.3	1323
GADSDEN AL	67706	169	30.2	45.6	75.8	5135
HUNTSVILLE AL	146565	194	30.5	45.6	76.1	11147
MOBILE AL	257816	5	29.0	22.8	51.8	13347
MONTGOMERY AL	138983	69	29.3	22.8	52.1	7241
TUSCALOOSA AL	85875	69	29.5	22.8	52.3	4487
ALABAMA NU-CP	1058052	76	29.5	22.8	52.3	55350
ALABAMA NU-MCP	1105788	264	31.0	45.6	76.6	84750
ALASKA						
ALASKA NU	302173	76	29.5	45.6	75.1	22697
ARIZONA						
PHOENIX AZ	863357	332	31.6	45.6	77.2	66689
TUCSON AZ	294184	728	35.8	45.6	81.4	23941
ARIZONA NU	614941	996	39.4	45.6	85.0	52283
ARKANSAS						
FORT SMITH AR	73419	137	30.0	45.6	75.6	5550
LITTLE ROCK AR	222616	101	29.7	22.8	52.5	11688
PINE BLUFF AR	60907	66	29.4	22.8	52.2	3181
TEXARKANA AR-TX	21682	102	29.7	22.8	52.5	1139
ARKANSAS NU-CP	1025647	61	29.4	22.8	52.2	53535
ARKANSAS NU-MCP	519024	515	33.4	45.6	79.0	41000

NU-Non-Urban CP-Coastal Plain MCP-Hot Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
CALIFORNIA						
BAKERSFIELD CA	176155	124	29.9	45.6	75.5	13297
FRESNO CA	262908	90	29.6	45.6	75.2	19775
LOS ANGELES CA	8351266	87	29.6	31.9	61.5	513610
MODESTO CA	106107	27	29.1	45.6	74.7	7931
OXNARD-VENT CA	244653	15	29.0	45.6	74.6	18263
SACRAMENTO CA	633732	8	29.0	45.6	74.6	47272
SALINAS CA	62456	15	29.0	45.6	74.6	4662
S BERNARDINO CA	583597	320	31.5	45.6	77.1	45014
SAN DIEGO CA	1198323	13	29.0	45.6	74.6	89432
S FRANCISCO CA	2987850	19	29.1	27.6	56.7	169349
SAN JOSE CA	1025273	20	29.1	27.6	56.7	58116
STA BARBARA CA	129774	13	29.0	35.9	64.9	8426
SANTA ROSA CA	75083	46	29.3	45.6	74.9	5622
SEASIDE-MONT CA	93284	15	29.0	45.6	74.6	6964
SIMI VALLEY CA	56936	233	30.8	45.6	76.4	4349
STOCKTON CA	160173	4	29.0	45.6	74.6	11958
CALIFORNIA NU	3805364	272	31.1	45.6	76.7	291923
COLORADO						
BOULDER CO	68634	1631	52.2	45.6	97.8	6712
COLORADO SPG CO	204766	1823	57.6	45.6	103.2	21132
DENVER CO	1047311	1609	51.6	89.7	141.3	148037
PUEBLO CO	103300	1430	47.4	45.6	93.0	9606
COLORADO NU	783248	1693	53.9	45.6	99.5	77906
CONNECTICUT						
BRIDGEPORT CT	413366	3	29.0	58.8	87.8	36276
BRISTOL CT	71732	101	29.7	45.6	75.3	5402
DANBURY CT	66651	113	29.8	45.6	75.4	5026
HARTFORD CT	465001	12	29.0	41.9	70.9	32981
MERIDEN CT	98454	46	29.3	53.2	82.5	8120
NEW BRITAIN CT	131349	61	29.4	61.6	91.0	11952
NEW HAVEN CT	348341	12	29.0	50.3	79.3	27633
NORWALK CT	106707	12	29.0	70.0	99.0	10567
SP'FIELD CT-MA	58173	26	29.1	40.0	69.1	4021
STAMFORD CT	184898	11	29.0	64.4	93.4	17272
WATERBURY CT	156986	79	29.5	61.6	91.1	14307
CONN NU	930559	105	29.7	45.6	75.3	70105

NU-Non-Urban CP-Coastal Plain NCP-Not C

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
DELAWARE						
WILMINGTN DE	349674	41	29.2	36.2	65.4	22884
DELAWARE NU-CP	198430	18	29.1	22.8	51.9	10293
DISTRICT OF COLUMBIA						
WASH DC	756510	46	29.3	35.4	64.7	48931
FLORIDA						
FT LAUD FL	613797	3	29.0	22.8	51.8	31769
GAINESVILLE FL	69329	55	29.3	22.8	52.1	3615
JACKSONVILLE FL	529585	6	29.0	22.8	51.8	27422
MIAMI FL	1219661	3	29.0	22.8	51.8	63128
ORLANDO FL	305479	21	29.1	11.6	40.7	12432
PENSACOLA FL	166619	5	29.0	22.8	51.8	8626
ST PETERSBRG FL	495159	6	29.0	22.8	51.8	25640
TALLAHASSEE FL	77851	56	29.4	22.8	52.2	4060
TAMPA FL	368742	5	29.0	22.8	51.8	19090
W PALM BEACH FL	287561	5	29.0	22.8	51.8	14887
FLORIDA NU-CP	2655660	30	29.2	22.8	52.0	137999
GEORGIA						
ALBANY GA	76512	58	29.4	22.8	52.2	3992
ATLANTA GA	1172778	320	31.5	57.2	88.7	104066
AUGUSTA GA-SC	126770	44	29.3	42.8	72.1	9135
CHATTA GA-TN	28947	206	30.6	45.6	76.2	2204
COLUMBUS GA-AL	183335	81	29.5	22.8	52.3	9597
MACON GA	128065	102	29.7	22.8	52.5	6725
SAVANNAH GA	163753	6	29.0	22.8	51.8	8479
GEORGIA NU-CP	1117211	76	29.5	22.8	52.3	58445
GEORGIA NU-NCP	1592204	309	31.4	45.6	77.0	122654
HAWAII						
HONOLULU HI	442397	5	29.0	45.6	74.6	32992
HAWAII NU	327516	94	29.6	45.6	75.2	24645

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
IDAHO						
BOISE ID	85187	823	37.0	45.6	82.6	7034
IDAHO NU	627821	1115	41.3	45.6	86.9	54575
ILLINOIS						
AURORA IL	232917	194	30.5	38.6	69.1	16083
BLOOMINGTON IL	69392	253	30.9	45.6	76.5	5312
CHAMPAIGN IL	100417	226	30.7	45.6	76.3	7663
CHICAGO IL	6185156	181	30.3	38.6	68.9	426463
DAVENPORT IL-IA	139824	180	30.3	45.6	75.9	10618
DECATUR IL	99693	208	30.6	45.6	76.2	7593
DUBUQUE IL-IA	2408	197	30.5	45.6	76.1	183
JOLIET IL	155500	166	30.2	44.3	74.5	11589
PEORIA IL	247121	143	30.0	45.6	75.6	18692
ROCKFORD IL	206084	218	30.7	45.6	76.3	15714
ST LOUIS IL-MO	314476	143	30.0	45.6	75.6	23787
SPRINGFIELD IL	120794	186	30.4	45.6	76.0	9179
ILLINOIS NU	3240194	225	30.7	45.6	76.3	247262
INDIANA						
ANDERSON IN	80704	272	31.1	45.6	76.7	6191
CHICAGO IN-IL	529422	181	30.3	38.6	68.9	36503
EVANSVILLE IN	142476	117	29.8	45.6	75.4	10748
FT WAYNE IN	225184	241	30.8	45.6	76.4	17214
INDIANAPOLIS IN	820259	216	30.6	45.6	76.2	62536
LAFAYETTE IN	79117	201	30.5	45.6	76.1	6022
LOUISV'LE IN-KY	81488	137	30.0	45.6	75.6	6160
MUNCIE IN	90427	290	31.3	45.6	76.9	6951
SO BEND IN -MI	265148	216	30.6	45.6	76.2	20215
TERRA HAUTE IN	80908	151	30.1	45.6	75.7	6125
INDIANA NU	2798536	237	30.8	45.6	76.4	213854
IOWA						
CEDAR RAPIDS IA	132008	223	30.7	45.6	76.3	10071
DAVENPORT IA-IL	126895	180	30.3	45.6	75.9	9636
DES MOINES IA	255824	245	30.9	45.6	76.5	19566
DUBUQUE IA-IL	63142	197	30.5	45.6	76.1	4804
OMAHA IA-NE	64847	317	31.5	45.6	77.1	5000
SOUIX CTY IA-NE	87157	338	31.7	45.6	77.3	6737
WATERLOO IA	112881	259	31.0	45.6	76.6	8647
IOWA NU	1982287	343	31.7	45.6	77.3	153310

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
KANSAS						
KANSAS CY KS-MO	350208	229	30.7	45.6	76.3	26735
ST JOSEPH KS-MO	1283	259	31.0	45.6	76.6	98
TOPEKA KS	132108	283	31.2	45.6	76.8	10147
WICHITA KS	302334	393	32.2	45.6	77.8	23523
KANSAS NU	1463138	479	33.0	45.6	78.6	115047
KENTUCKY						
CINTI KY-OH	196978	168	30.2	30.2	60.4	11905
HUNT KY-WV-OH	53316	172	30.3	45.6	75.9	4045
LEXINGTON KY	159538	291	31.3	45.6	76.9	12265
LOUISV'LE KY-IN	657908	137	30.0	45.6	75.6	49733
OWENSBORO KY	53133	146	30.1	45.6	75.7	4020
KENTUCKY NU-CP	164822	104	29.7	22.8	52.5	8658
KENTUCKY NU-NCP	1933616	285	31.2	45.6	76.8	148545
LOUISIANA						
BATON ROUGE LA	249463	17	29.1	22.8	51.9	12939
LAFAYETTE LA	78544	9	29.0	22.8	51.8	4069
LAKE CHARLES LA	88260	6	29.0	22.8	51.8	4570
MONROE LA	90567	25	29.1	22.8	51.9	4702
NEW ORLEANS LA	961728	2	28.9	22.8	51.7	49767
SHREVEPORT LA	234564	62	29.4	22.8	52.2	12246
LOUISIANA NU-CP	1940054	30	29.2	22.8	52.0	100813
MAINE						
LEWISTON ME	65212	61	29.4	45.6	75.0	4891
PORTLAND ME	106599	8	29.0	45.6	74.6	7951
MAINE NU	821852	120	29.9	45.6	75.5	62016
MARYLAND						
BALTIMORE MD	1579781	6	29.0	27.4	56.4	89070
WASH DC(MD)	1009138	46	29.3	35.4	64.7	65271
MARYLAND NU-CP	568333	30	29.2	22.8	52.0	29533
MARYLAND NU-NCP	765147	170	30.3	45.6	75.9	58062

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
MASSACHUSETTS						
BOSTON MA	2652575	8	29.0	45.6	74.6	197874
BROCKTON MA	148844	40	29.2	45.6	74.8	11139
FALL RIV MA-RI	123491	12	29.0	45.6	74.6	9216
FITCH-LEO MA	78053	134	30.0	45.6	75.6	5898
LAW-HAVER MA-NH	182438	20	29.1	45.6	74.7	13625
LOWELL MA	182731	30	29.2	45.6	74.8	13662
NEW BEDFORD MA	133667	5	29.0	45.6	74.6	9968
PITTSFIELD MA	62872	309	31.4	27.9	59.3	3731
PRO'DENCE MA-RI	65974	24	29.1	41.9	71.0	4685
SPRNGFLD MA-CT	456135	26	29.1	40.0	69.1	31532
WORCESTER MA	247416	145	30.1	53.1	83.2	20573
MASS NU	1354974	150	30.1	45.6	75.7	102564
MICHIGAN						
ANN ARBOR MI	178605	268	31.1	45.6	76.7	13695
BAY CITY MI	78097	181	30.3	45.6	75.9	5931
DETROIT MI	3970584	183	30.4	45.6	76.0	301613
FLINT MI	330128	218	30.7	45.6	76.3	25173
GRD RAPIDS MI	352703	186	30.4	45.6	76.0	26801
JACKSON MI	78572	287	31.2	45.6	76.8	6037
KALAMAZOO MI	152083	230	30.8	45.6	76.4	11612
LANSING MI	229518	253	30.9	45.6	76.5	17569
MUSKEGON MI	105716	191	30.4	45.6	76.0	8037
SAGINAW MI	147552	181	30.3	45.6	75.9	11206
SO BEND MI-IN	23424	216	30.6	45.6	76.2	1786
TOLEDO MI-OH	11861	179	30.3	45.6	75.9	901
MICHIGAN NU	1216240	249	30.9	45.6	76.5	24p089
MINNESOTA						
DULUTH MN-WI	105619	186	30.4	45.6	76.0	8027
FARG MOOR MN-ND	32026	274	31.1	45.6	76.7	2457
LA CROSSE MN-WI	3142	198	30.5	45.6	76.1	239
MINN-ST PAUL MN	1704423	248	30.9	31.2	62.1	105861
ROCHESTER MN	56604	302	31.4	45.6	77.0	4357
MINNESOTA NU	1903235	428	32.5	45.6	78.1	148702

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
MISSISSIPPI						
BILOXI-GULF MS	121601	5	29.0	22.8	51.8	6295
JACKSON MS	190060	90	29.6	22.8	52.4	9962
MEMPHIS MS-TN	8931	84	29.6	22.8	52.4	468
MISS'IPPI NU-CP	1896320	81	29.6	22.8	52.4	99279
MISSOURI						
COLUMBIA MO	59231	225	30.7	45.6	76.3	4520
KANSAS CY MO-KS	751579	229	30.7	45.6	76.3	57377
ST JOSEPH MO-KS	75940	259	31.0	45.6	76.6	5817
ST LOUIS MO-IL	1568468	143	30.0	45.6	75.6	118640
SPRINGFIELD MO	121340	396	32.2	45.6	77.8	9444
MISSOURI NU-CP	149905	107	29.8	22.8	52.6	7878
MISSOURI NU-NCP	1950936	269	31.1	45.6	76.7	149602
MONTANA						
BILLINGS MT	71197	951	38.7	45.6	84.3	6005
GREAT FALLS MT	70905	1015	39.7	45.6	85.3	6049
MONTANA NU	552307	1073	40.6	45.6	86.2	47627
NEBRASKA						
LINCOLN NE	153443	351	31.8	45.6	77.4	11878
OMAHA NE-IA	426929	317	31.5	45.6	77.1	32919
SIOUX CY NE-IA	7920	338	31.7	45.6	77.3	612
NEBRASKA NU	895499	489	33.1	45.6	78.7	70506
NEVADA						
LAS VEGAS NV	236681	619	34.5	19.9	54.4	12877
RENO NV	99687	1371	46.1	45.6	91.7	9145
NEVADA NU	152370	1391	46.6	45.6	92.2	14043
NEW HAMPSHIRE						
LAW HAVER NH-MA	17842	20	29.1	45.6	74.7	1333
MANCHESTER NH	95140	53	29.3	45.6	74.9	7130
NASHUA NH	60961	46	29.3	45.6	74.9	4565
NEW HAMP NU	563738	217	30.6	45.6	76.2	42982

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
NEW JERSEY						
ALLEN-BETHNJ-PA	25201	78	29.5	45.6	75.1	1893
ATLANTIC CY NJ	134016	3	29.0	22.8	51.8	6936
NEW YORK NJ-NY	4837265	9	29.0	45.6	74.6	360879
PHILADEL NJ-PA	744045	14	29.0	47.5	76.5	56948
TRENTON NJ-PA	242673	11	29.0	41.9	70.9	17209
VINELAND NJ	73579	15	29.0	22.8	51.8	3815
WILMINGTN NJ-DE	21593	41	29.2	36.2	65.4	1413
N JERSEY NU-CP	369678	61	29.4	22.8	52.2	19296
N JERSEY NU-NCP	720114	90	29.6	45.6	75.2	54167
NEW MEXICO						
ALBUQUERQUE NM	297451	1511	49.2	69.5	118.7	35321
NEW MEXICO NU	718549	1601	51.4	45.6	97.0	69734
NEW YORK						
ALBANY NY	486525	6	29.0	25.1	54.1	26312
BINGHAMPTON NY	167224	264	31.0	45.6	76.6	12816
BUFFALO NY	1086594	178	30.3	45.6	75.9	82499
NEW YORK NY	11369576	9	29.0	45.6	74.6	848214
ROCHESTER NY	601361	157	30.2	45.6	75.8	45554
SYRACUSE NY	376169	122	29.9	45.6	75.5	28390
UTICA ROME NY	180355	126	29.9	45.6	75.5	13618
NEW YORK NU	3973462	166	30.2	45.6	75.8	301279
NORTH CAROLINA						
ASHEVILLE NC	72451	675	35.2	45.6	80.8	5851
CHARLOTTE NC	279530	220	30.7	45.6	76.3	21319
DURHAM NC	100764	126	29.9	45.6	75.5	7608
FAYETTEVILLE NC	161370	52	29.3	22.8	52.1	8412
HIGH POINT NC	93547	287	31.2	45.6	76.8	7188
GREENSBORO NC	152252	256	31.0	45.6	76.6	11659
RALEIGH NC	152289	111	29.8	45.6	75.4	11480
WILMINGTON NC	57645	15	29.0	22.8	51.8	2989
WINSTON SAL NC	142584	262	31.0	45.6	76.6	10926
N CAROL NU-CP	1442903	30	29.2	22.8	52.0	74979
N CAROL NU-NCP	2426724	367	32.0	45.6	77.6	188217

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Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
NORTH DAKOTA						
FARG MOOR ND-MN	53420	274	31.1	45.6	76.7	4099
N DAKOTA NU	564341	514	33.4	45.6	79.0	44578
OHIO						
AKRON OH	542775	313	31.5	45.6	77.1	41833
CANTON OH	244279	323	31.6	45.6	77.2	18849
CINCINNATI OH	913536	168	30.2	30.2	60.4	55212
CLEVELAND OH	1959880	207	30.6	45.6	76.2	149271
COLUMBUS OH	790019	238	30.8	41.9	72.7	57449
DAYTON OH	685942	231	30.8	41.9	72.7	49840
HAMILTON OH	90912	184	30.4	45.6	76.0	6907
HUNT OH-KY-WV	29250	172	30.3	45.6	75.9	2219
LIMA OH	70295	268	31.1	47.5	78.6	5524
LOR-ELYRIA OH	192265	185	30.4	45.6	76.0	14609
MANSFIELD OH	77599	351	31.8	45.6	77.4	6007
SPRINGFIELD OH	93653	299	31.3	45.6	76.9	7206
STEUBENVL OH-WV	48262	218	30.7	60.5	91.2	4399
TOLEDO OH	475928	179	30.3	45.6	75.9	36137
WHEELING OH-WV	32239	198	30.5	68.9	99.4	3204
YOUNGSTOWN OH	395540	256	31.0	40.8	71.8	28390
OHIO NU	4009643	244	30.9	45.6	76.5	306609
OKLAHOMA						
FT SMITH OK-AR	2098	137	30.0	45.6	75.6	159
LAWTON OK	95687	338	31.7	45.6	77.3	7396
OKLAHOMA CY OK	579788	368	32.0	45.6	77.6	44973
TULSA OK	371499	227	30.7	45.6	76.3	28355
OKLAHOMA NU-CP	68807	137	30.0	22.8	52.8	3632
OKLAHOMA NU-NCP	1441374	461	32.9	45.6	78.5	113083
OREGON						
EUGENE OR	139255	129	29.9	45.6	75.5	10517
PORTLAND OR-WA	751756	23	29.1	45.6	74.7	56165
SALEM OR	93041	37	29.2	45.6	74.8	6960
OREGON NU	1107333	324	31.6	45.6	77.2	85453

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Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
PENNSYLVANIA						
ALLEN-BETH PA	338316	78	29.5	45.6	75.1	25416
ALTOONA PA	81795	360	31.9	45.6	77.5	6339
ERIE PA	175263	209	30.6	45.6	76.2	13351
HARRISBURG PA	240751	111	29.8	45.6	75.4	18149
JOHNSTOWN PA	96146	361	31.9	45.6	77.5	7452
LANCASTER PA	117097	108	29.8	45.6	75.4	8825
PHILADEL PA-NJ	3277021	14	29.0	42.5	71.5	234432
PITTSBURG PA	1846042	232	30.8	52.0	82.8	152792
READING PA	167932	81	29.5	45.6	75.1	12620
SCRANTON PA	204205	221	30.7	45.6	76.3	15576
TRENTON PA-NJ	31475	11	29.0	41.9	70.9	2232
WILKES BARRE PA	222830	195	30.5	45.6	76.1	16949
YORK PA	123106	113	29.8	45.6	75.4	9282
PENN NU	4871930	229	30.7	22.8	53.5	260851
RHODE ISLAND						
FALL RIV RI-MA	15901	12	29.0	45.6	74.6	1187
PRO'DENCE RI-MA	729337	24	29.1	41.9	71.0	51796
RHODE ID NU	204485	61	29.4	45.6	75.0	15336
SOUTH CAROLINA						
AUGUSTA SC-GA	22183	44	29.3	42.8	72.1	1599
CHARLESTON SC	228399	3	29.0	22.8	51.8	11821
COLUMBIA SC	241781	79	29.5	68.3	97.8	23655
GREENVILLE SC	157073	294	31.3	22.8	54.1	8499
S CAROL NU-CP	818823	30	29.2	22.8	52.0	42549
S CAROL NU-NCP	1122257	209	30.6	45.6	76.2	85492
SOUTH DAKOTA						
SIOUX CY SD-IA	860	338	31.7	45.6	77.3	66
SIOUX FALLS SD	75146	425	32.5	45.6	78.1	5869
S DAKOTA NU	590251	603	34.3	45.6	79.9	47178
TENNESSEE						
CHATTA TN-GA	194633	206	30.6	45.6	76.2	14821
KNOXVILLE TN	190502	271	31.1	60.0	91.1	17356
MEMPHIS TN	655045	84	29.6	22.8	52.4	34306
NASHVILLE TN	448444	137	30.0	45.6	75.6	33899
TENN NU-CP	556808	91	29.6	22.8	52.4	29194
TENN NU-NCP	1878732	313	31.5	45.6	77.1	144792

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Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
TEXAS						
ABILENE TX	90571	530	33.6	45.6	79.2	7169
AMARILLO TX	127010	1120	41.4	45.6	87.0	11052
AUSTIN TX	264499	168	30.2	22.8	53.0	14028
BEAUMONT TX	116350	7	29.0	22.8	51.8	6026
BROWNSVILLE TX	52627	13	29.0	22.8	51.8	2728
BRYAN TX	51395	110	29.8	22.8	52.6	2702
CORPUS CHRIS TX	212820	11	29.0	22.8	51.8	11027
DALLAS TX	1338684	156	30.1	22.8	52.9	70875
EL PASO TX	337471	1147	41.9	45.6	87.5	29516
FT WORTH TX	676944	204	30.5	45.6	76.1	51541
GALVESTON TX	61809	6	29.0	19.7	48.7	3009
HARLINGEN TX	50469	11	29.0	22.8	51.8	2615
HOUSTON TX	1677863	17	29.1	19.7	48.8	81814
LAREDO TX	70197	128	29.9	22.8	52.7	3701
LUBBOCK TX	150135	988	39.3	45.6	84.9	12746
MCALLEN TX	91141	129	29.9	22.8	52.7	4805
MIDLAND TX	60371	847	37.3	45.6	82.9	5004
ODESSA TX	81645	881	37.8	45.6	83.4	6805
PT ARTHUR TX	116474	3	29.0	22.8	51.8	6028
SAN ANGELO TX	63884	563	33.9	45.6	79.5	5079
SAN ANTONIO TX	772513	214	30.6	22.8	53.4	41265
SHERMAN TX	55343	219	30.7	22.8	53.5	2959
TEXARKANA TX-AR	36888	102	29.7	22.8	52.5	1937
TEXAS CITY TX	84054	6	29.0	22.8	51.8	4352
TYLER TX	59781	166	30.2	22.8	53.0	3170
WACO TX	118843	130	29.9	22.8	52.7	6267
WICHITA FALL TX	97564	288	31.3	45.6	76.9	7498
TEXAS NU-CP	2972390	76	29.5	22.8	52.3	155496
TEXAS NU-NCP	1306995	728	35.8	45.6	81.4	106357
UTAH						
OGDEN UT	149727	1311	44.9	45.6	90.5	13551
PROVO UT	104110	1387	46.5	45.6	92.1	9584
SALT LAKE CY UT	479342	1298	44.7	45.6	90.3	43266
UTAH NU	326094	1533	49.8	45.6	95.4	31093
VERMONT						
VERMONT NU	444732	180	30.3	45.6	75.9	33772

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-1. Average Dose Equivalents from Terrestrial and Cosmic Radiation (continued)
(Not Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
VIRGINIA						
LYNCHBURG VA	70842	198	30.5	45.6	76.1	5390
NEWPORT NEWS VA	268263	6	29.0	19.5	48.5	13006
NORFOLK VA	668259	4	29.0	19.5	48.5	32386
PETERSBURG VA	100617	23	29.1	22.8	51.9	5222
RICHMOND VA	416563	46	29.3	22.8	52.1	21695
ROANOKE VA	156621	289	31.3	45.6	76.9	12038
WASH DC(VA)	715841	46	29.3	35.4	64.7	46300
VIRGINIA NU-CP	556040	30	29.2	22.8	52.0	28894
VIRGINIA NU-NCP	1695448	370	32.0	45.6	77.6	131547
WASHINGTON						
PORTLAND WA-OR	73170	23	29.1	45.6	74.7	5467
SEATTLE WA	1238107	38	29.2	45.6	74.8	92637
SPOKANE WA	229620	360	31.9	45.6	77.5	17794
TACOMA WA	332521	76	29.5	45.6	75.1	24977
WASHINGTON NU	1535751	176	30.3	45.6	75.9	116570
WEST VIRGINIA						
CHARLESTON WV	157662	183	30.4	45.6	76.0	11977
HUNT WV-KY-OH	85017	172	30.3	45.6	75.9	6451
STEUBENVL WV-OH	37230	218	30.7	60.5	91.2	3394
WHEELING WV-OH	60705	198	30.5	68.9	99.4	6033
WEST VA NU	1403623	433	32.6	45.6	78.2	109741
WISCONSIN						
APPLETON WI	129532	219	30.7	45.6	76.3	9878
DULUTH WI-MN	32713	186	30.4	45.6	76.0	2486
GREEN BAY WI	129105	180	30.3	45.6	75.9	9804
KENOSHA WI	84262	186	30.4	45.6	76.0	6403
LA CROSSE WI-MN	60231	198	30.5	45.6	76.1	4583
MADISON WI	205457	262	31.0	45.6	76.6	15744
MILWAUKEE WI	1252457	186	30.4	45.6	76.0	95170
OSHKOSH WI	55480	229	30.7	45.6	76.3	4235
RACINE WI	117408	192	30.4	45.6	76.0	8927
WISCONSIN NU	2351288	295	31.3	45.6	76.9	180845
WYOMING						
WYOMING NU	332416	1768	56.0	45.6	101.6	33763

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
ALABAMA						
BIRMINGHAM AL	558099	183	27.3	29.2	56.5	31538
COLUMBUS AL-GA	25281	81	26.6	14.6	41.2	1041
GADSDEN AL	67706	169	27.2	29.2	56.4	3819
HUNTSVILLE AL	146565	194	27.4	29.2	56.6	8294
MOBILE AL	257816	5	26.1	14.6	40.7	10484
MONTGOMERY AL	138983	49	26.4	14.6	41.0	5693
TUSCALOOSA AL	85875	69	26.5	14.6	41.1	3530
ALABAMA NU-CP	1058052	76	26.6	14.6	41.2	43543
ALABAMA NU-NCP	1105788	264	27.9	29.2	57.1	63165
ALASKA						
ALASKA NU	302173	76	26.6	29.2	55.7	16845
ARIZONA						
PHOENIX AZ	863357	332	28.5	29.2	57.7	49784
TUCSON AZ	294184	728	32.2	29.2	61.4	18059
ARIZONA NU	614941	996	35.5	29.2	64.7	39764
ARKANSAS						
FORT SMITH AR	73419	137	27.0	29.2	56.2	4124
LITTLE ROCK AR	222616	101	26.7	14.6	41.3	9200
PINE BLUFF AR	60907	66	26.5	14.6	41.1	2502
TEXARKANA AR-TX	21682	102	26.7	14.6	41.3	896
ARKANSAS NU-CP	1025647	61	26.5	14.6	41.0	42101
ARKANSAS NU-NCP	519024	515	30.1	29.2	59.2	30746

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
CALIFORNIA						
BAKERSFIELD CA	176155	124	26.9	29.2	56.1	9879
FRESNO CA	262908	90	26.7	29.2	55.8	14681
LOS ANGELES CA	8351266	87	26.6	20.4	47.1	392984
MODESTO CA	106107	27	26.2	29.2	55.4	5880
OXNARD-VENT CA	244653	15	26.1	29.2	55.3	13536
SACRAMENTO CA	633732	8	26.1	29.2	55.3	35031
SALINAS CA	62456	15	26.1	29.2	55.3	3456
S BERNARDINO CA	583597	320	28.4	29.2	57.6	33593
SAN DIEGO CA	1198323	13	26.1	29.2	55.3	66282
S FRANCISCO CA	2987850	19	26.2	17.7	43.8	130973
SAN JOSE CA	1025273	20	26.2	17.7	43.8	44947
STA BARBARA CA	129774	13	26.1	23.0	49.1	6372
SANTA ROSA CA	75083	46	26.4	29.2	55.5	4170
SEASIDE-MONT CA	93284	15	26.1	29.2	55.3	5161
SIMI VALLEY CA	56936	233	27.7	29.2	56.9	3239
STOCKTON CA	160373	4	26.1	29.2	55.3	8861
CALIFORNIA NU	3805364	272	28.0	29.2	57.2	217615
COLORADO						
BOULDER CO	68634	1631	47.0	29.2	76.2	5227
COLORADO SPG CO	204766	1823	51.8	29.2	81.0	16591
DENVER CO	1047311	1609	46.5	57.4	103.9	108808
PUEBLO CO	103300	1430	42.6	29.2	71.8	7420
COLORADO NU	783248	1693	48.5	29.2	77.7	60829
CONNECTICUT						
BRIDGEPORT CT	413366	3	26.1	37.6	63.7	26329
BRISTOL CT	71732	101	26.7	29.2	55.9	4011
DANBURY CT	66651	113	26.8	29.2	56.0	3733
HARTFORD CT	465001	12	26.1	26.8	52.9	24617
MERIDEN CT	98454	46	26.4	34.0	60.4	5947
NEW BRITAIN CT	131349	61	26.5	39.4	65.9	8653
NEW HAVEN CT	348341	12	26.1	32.2	58.3	20314
NORWALK CT	106707	12	26.1	44.8	70.9	7568
SP'FIELD CT-MA	58173	26	26.2	25.6	51.8	3014
STAMFORD CT	184898	11	26.1	41.2	67.3	12449
WATERBURY CT	156986	79	26.6	39.4	66.0	10362
CONN NU	930559	105	26.8	29.2	55.9	52062

NU-Non-Urban CP-Coastal Plain NCP-Hot Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
DELAWARE						
WILMINGTN DE	349674	41	26.3	23.2	49.5	17305
DELAWARE NU-CP	198430	18	26.2	14.6	40.8	8087
DISTRICT OF COLUMBIA						
WASH DC	756510	46	26.4	22.7	49.0	37075
FLORIDA						
FT LAUD FL	613797	3	26.1	14.6	40.7	24954
GAINESVILLE FL	69329	55	26.4	14.6	41.0	2843
JACKSONVILLE FL	529585	6	26.1	14.6	40.7	21541
MIAMI FL	1219661	3	26.1	14.6	40.7	49585
ORLANDO FL	305479	21	26.2	7.4	33.6	10267
PENSACOLA FL	166619	5	26.1	14.6	40.7	6776
ST PETERSBRG FL	495159	6	26.1	14.6	40.7	20141
TALLAHASSEE FL	77851	56	26.4	14.6	41.0	3193
TAMPA FL	368742	5	26.1	14.6	40.7	14995
W PALM BEACH FL	287561	5	26.1	14.6	40.7	11694
FLORIDA NU-CP	2655660	10	26.2	14.6	40.8	108457
GEORGIA						
ALBANY GA	76512	58	26.4	14.6	41.0	3139
ATLANTA GA	1172778	320	28.4	36.6	65.0	76218
AUGUSTA GA-SC	126770	44	26.3	27.4	53.7	6811
CHATTA GA-TN	28947	206	27.5	29.2	56.7	1641
COLUMBUS GA-AL	183335	81	26.6	14.6	41.2	7551
MACON GA	128065	102	26.7	14.6	41.3	5294
SAVANNAH GA	163751	6	26.1	14.6	40.7	6661
GEORGIA NU-CP	1117211	76	26.6	14.6	41.2	45978
GEORGIA NU-NCP	1592204	309	28.3	29.2	57.5	91511
HAWAII						
HONOLULU HI	442197	5	26.1	29.2	55.3	24448
HAWAII NU	327516	94	26.7	29.2	55.9	18297

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
IDAHO						
BOISE ID	85187	823	33.3	29.2	62.5	5321
IDAHO NU	627821	1115	37.2	29.2	66.4	41674
ILLINOIS						
AURORA IL	232917	194	27.4	24.7	52.1	12138
BLOOMINGTON IL	69392	253	27.9	29.2	57.0	3958
CHAMPAIGN IL	100417	226	27.6	29.2	56.8	5707
CHICAGO IL	6185156	181	27.3	24.7	52.0	321742
DAVENPORT IL-IA	139824	180	27.3	29.2	56.5	7898
DECATUR IL	99693	208	27.5	29.2	56.7	5652
DUBUQUE IL-IA	2408	197	27.4	29.2	56.6	136
JOLIET IL	155500	166	27.2	28.4	55.6	8639
PEORIA IL	247121	143	27.0	29.2	56.2	13893
ROCKFORD IL	206084	218	27.6	29.2	56.8	11700
ST LOUIS IL-MO	314476	143	27.0	29.2	56.2	17680
SPRINGFIELD IL	120794	186	27.3	29.2	56.5	6829
ILLINOIS NU	3240194	225	27.6	29.2	56.8	184120
INDIANA						
ANDERSON IN	80704	272	28.0	29.2	57.2	4615
CHICAGO IN-IL	529422	181	27.3	24.7	52.0	27540
EVANSVILLE IN	142476	117	26.9	29.2	56.0	7984
FT WAYNE IN	225184	241	27.8	29.2	56.9	12823
INDIANAPOLIS IN	820259	216	27.6	29.2	56.8	46557
LAFAYETTE IN	79117	201	27.5	29.2	56.6	4482
LOUISV'LE IN-KY	81488	137	27.0	29.2	56.2	4578
MUNCIE IN	90427	290	28.1	29.2	57.3	5183
SO BEND IN -MI	265148	216	27.6	29.2	56.8	15050
TERRA HAUTE IN	80908	151	27.1	29.2	56.3	4553
INDIANA NU	2798536	237	27.7	29.2	56.9	159289
IOWA						
CEDAR RAPIDS IA	132008	223	27.6	29.2	56.8	7499
DAVENPORT IA-IL	126895	180	27.3	29.2	56.5	7168
DES MOINES IA	255824	245	27.8	29.2	57.0	14577
DUBUQUE IA-IL	63142	197	27.4	29.2	56.6	3575
OMAHA IA-NE	64847	317	28.4	29.2	57.5	3731
SOUIX CTY IA-NE	87157	338	28.5	29.2	57.7	5030
WATERLOO IA	112881	259	27.9	29.2	57.1	6444
IOWA NU	1982287	343	28.6	29.2	57.8	114477

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
KANSAS						
KANSAS CY KS-MO	350208	229	27.7	29.2	56.9	19910
ST JOSEPH KS-MO	1283	259	27.9	29.2	57.1	73
TOPEKA KS	132108	283	28.1	29.2	57.3	7566
WICHITA KS	302314	393	29.0	29.2	58.2	17586
KANSAS NU	1463138	479	29.7	29.2	58.9	86195
KENTUCKY						
CINTI KY-OH	196978	168	27.2	19.3	46.5	9168
HUNT KY-WV-OH	53316	172	27.2	29.2	56.4	3009
LEXINGTON KY	159538	291	28.2	29.2	57.3	9147
LOUISV'LE KY-IN	657908	137	27.0	29.2	56.2	36959
OWENSBORO KY	53133	146	27.1	29.2	56.2	2988
KENTUCKY NU-CP	164822	104	26.8	14.6	41.3	6815
KENTUCKY NU-NCP	1933616	285	28.1	29.2	57.3	110765
LOUISIANA						
BATON ROUGE LA	249463	17	26.2	14.6	40.8	10166
LAFAYETTE LA	78544	9	26.1	14.6	40.7	3196
LAKE CHARLES LA	88260	6	26.1	14.6	40.7	3590
MONROE LA	90567	25	26.2	14.6	40.8	3695
NEW ORLEANS LA	961728	2	26.1	14.6	40.6	39089
SHREVEPORT LA	234564	62	26.5	14.6	41.1	9630
LOUISIANA NU-CP	1940054	30	26.2	14.6	40.8	79231
MAINE						
LEWISTON ME	65212	61	26.5	29.2	55.6	3628
PORTLAND ME	106599	8	26.1	29.2	55.3	5892
MAINE NU	821852	120	26.9	29.2	56.1	46071
MARYLAND						
BALTIMORE MD	1579781	6	26.1	17.5	43.6	68908
WASH DC(MD)	1009138	46	26.4	22.7	49.0	49456
MARYLAND NU-CP	568333	30	26.2	14.6	40.8	23211
MARYLAND NU-NCP	765147	170	27.2	29.2	56.4	43166

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
MASSACHUSETTS						
BOSTON MA	2652575	8	26.1	29.2	55.3	146638
BROCKTON MA	148844	40	26.3	29.2	55.5	8260
FALL RIV MA-RI	123491	12	26.1	29.2	55.3	6830
FITCH-LEO MA	78053	134	27.0	29.2	56.2	4383
LAW-HAVER MA-NH	182438	20	26.2	29.2	55.4	10100
LOWELL MA	182731	30	26.2	29.2	55.4	10129
NEW BEDFORD MA	133667	5	26.1	29.2	55.3	7386
PITTSFIELD MA	62872	309	28.3	17.9	46.2	2902
PRO'DENCE MA-RI	65974	24	26.2	26.8	53.0	3498
SPRNGFLD MA-CT	456135	26	26.2	25.6	51.8	23635
WORCESTER MA	247416	145	27.0	34.0	61.0	15100
MASS NU	1354974	150	27.1	29.2	56.3	76243
MICHIGAN						
ANN ARBOR MI	178605	268	28.0	29.2	57.2	10208
BAY CITY MI	78097	181	27.3	29.2	56.5	4412
DETROIT MI	3970584	183	27.3	29.2	56.5	224376
FLINT MI	330128	218	27.6	29.2	56.8	18742
GRD RAPIDS MI	352703	186	27.3	29.2	56.5	19939
JACKSON MI	78572	287	28.1	29.2	57.3	4502
KALAMAZOO MI	152083	230	27.7	29.2	56.9	8648
LANSING MI	229518	253	27.9	29.2	57.0	13091
MUSKEGON MI	105716	191	27.4	29.2	56.6	5980
SAGINAW MI	147552	181	27.3	29.2	56.5	8336
SO BEND MI-IN	23424	216	27.6	29.2	56.8	1330
TOLEDO MI-OH	11861	179	27.3	29.2	56.5	670
MICHIGAN NU	3216240	249	27.8	29.2	57.0	183349
MINNESOTA						
DULUTH MN-WI	105639	186	27.3	29.2	56.5	5972
FARG MOOR MN-ND	32026	274	28.0	29.2	57.2	1832
LA CROSSE MN-WI	3142	198	27.4	29.2	56.6	178
MINN-ST PAUL MN	1704423	248	27.8	20.0	47.8	81448
ROCHESTER MN	56604	302	28.2	29.2	57.4	3250
MINNESOTA NU	1903235	428	29.3	29.2	58.5	111267

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
MISSISSIPPI						
BILOXI-GULF MS	121601	5	26.1	14.6	40.7	4945
JACKSON MS	190060	90	26.7	14.6	41.2	7840
MEMPHIS MS-TN	8931	84	26.6	14.6	41.2	368
MISS'IPPI NU-CP	1896320	81	26.6	14.6	41.2	78110
MISSOURI						
COLUMBIA MO	59231	225	27.6	29.2	56.8	3366
KANSAS CY MO-KS	751579	229	27.7	29.2	56.9	42728
ST JOSEPH MO-KS	75940	259	27.9	29.2	57.1	4335
ST LOUIS MO-IL	1568468	143	27.0	29.2	56.2	88181
SPRINGFIELD MO	121340	396	29.0	29.2	58.2	7061
MISSOURI NU-CP	149905	107	26.8	14.6	41.4	6201
MISSOURI NU-NCP	1950936	269	28.0	29.2	57.2	111511
MONTANA						
BILLINGS MT	71197	951	34.9	29.2	64.1	4561
GREAT FALLS MT	70905	1015	35.7	29.2	64.9	4603
MONTANA NU	552307	1073	36.6	29.2	65.8	36316
NEBRASKA						
LINCOLN NE	153443	351	28.6	29.2	57.8	8871
OMAHA NE-IA	426929	317	28.4	29.2	57.5	24566
SIOUX CY NE-IA	7920	338	28.5	29.2	57.7	457
NEBRASKA NU	895499	489	29.8	29.2	59.0	52839
NEVADA						
LAS VEGAS NV	236681	619	31.1	12.7	43.8	10365
RENO NV	99687	1371	41.5	29.2	70.7	7048
NEVADA NU	152370	1391	41.9	29.2	71.1	10832
NEW HAMPSHIRE						
LAW HAVER NH-MA	17842	20	26.2	29.2	55.4	988
MANCHESTER NH	95140	53	26.4	29.2	55.6	5289
NASHUA NH	60961	46	26.4	29.2	55.5	3386
NEW HAMP NU	563738	217	27.6	29.2	56.8	32000

NU-Non-Urban CP-Coastal Plain NCP-Hot Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
NEW JERSEY						
ALLEN-BETHNJ-PA	25201	78	26.6	29.2	55.8	1405
ATLANTIC CY NJ	134016	3	26.1	14.6	40.7	5448
NEW YORK NJ-NY	4837265	9	26.1	29.2	55.3	267440
PHILADEL NJ-PA	744045	14	26.1	30.4	56.5	42064
TRENTON NJ-PA	242673	11	26.1	26.8	52.9	12845
VINELAND NJ	73579	15	26.1	14.6	40.7	2997
WILMINGTN NJ-DE	21593	41	26.3	23.2	49.5	1069
N JERSEY NU-CP	369678	61	26.5	14.6	41.0	15175
N JERSEY NU-NCP	720114	90	26.7	29.2	55.8	40212
NEW MEXICO						
ALBUQUERQUE NM	297451	1511	44.3	44.5	88.8	26414
NEW MEXICO NU	718549	1601	46.3	29.2	75.5	54241
NEW YORK						
ALBANY NY	486525	6	26.1	16.1	42.1	20506
BINGHAMPTON NY	167224	264	27.9	29.2	57.1	9552
BUFFALO NY	1086594	178	27.3	29.2	56.5	61366
NEW YORK NY	11369576	9	26.1	29.2	55.3	628595
ROCHESTER NY	601361	157	27.1	29.2	56.3	33869
SYRACUSE NY	376169	122	26.9	29.2	56.1	21091
UTICA ROME NY	180355	126	26.9	29.2	56.1	10118
NEW YORK NU	3973462	166	27.2	29.2	56.4	224041
NORTH CAROLINA						
ASHEVILLE NC	72451	675	31.6	29.2	60.8	4407
CHARLOTTE NC	279530	220	27.6	29.2	56.8	15873
DURHAM NC	100764	126	26.9	29.2	56.1	5653
FAYETTEVILLE NC	161370	52	26.4	14.6	41.0	6614
HIGH POINT NC	93547	287	28.1	29.2	57.3	5360
GREENSBORO NC	152252	256	27.9	29.2	57.1	8688
RALEIGH NC	152289	111	26.8	29.2	56.0	8526
WILMINGTON NC	57645	15	26.1	14.6	40.7	2348
WINSTON SAL NC	142584	262	27.9	29.2	57.1	8143
N CAROL NU-CP	1442903	30	26.2	14.6	40.8	58928
N CAROL NU-NCP	2426724	367	28.8	29.2	57.9	140624

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
NORTH DAKOTA						
FARG MOOR ND-MN	53420	274	28.0	29.2	57.2	3056
N DAKOTA NU	564341	514	30.1	29.2	59.2	33429
OHIO						
AKRON OH	542775	313	28.3	29.2	57.5	31214
CANTON OH	244279	323	28.4	29.2	57.6	14068
CINCINNATI OH	913536	168	27.2	19.3	46.5	42518
CLEVELAND OH	1959880	207	27.5	29.2	56.7	111107
COLUMBUS OH	790019	238	27.7	26.8	54.6	43098
DAYTON OH	685942	231	27.7	26.8	54.5	37384
HAMILTON OH	90912	184	27.3	29.2	56.5	5138
HUNT OH-KY-WV	29250	172	27.2	29.2	56.4	1651
LIMA OH	70295	268	28.0	30.4	58.4	4103
LOR-ELYRIA OH	192265	185	27.3	29.2	56.5	10868
MANSFIELD OH	77599	351	28.6	29.2	57.8	4486
SPRINGFIELD OH	93653	299	28.2	29.2	57.4	5375
STEUBENVL OH-WV	48262	218	27.6	38.7	66.3	3200
TOLEDO OH	475928	179	27.3	29.2	56.5	26881
WHEELING OH-WV	32239	198	27.4	44.1	71.5	2306
YOUNGSTOWN OH	395540	256	27.9	26.1	54.0	21355
OHIO NU	4009643	244	27.8	29.2	57.0	228410
OKLAHOMA						
FT SMITH OK-AR	2098	137	27.0	29.2	56.2	118
LAWTON OK	95687	338	28.5	29.2	57.7	5522
OKLAHOMA CY OK	579788	368	28.8	29.2	58.0	33602
TULSA OK	371499	227	27.7	29.2	56.8	21115
OKLAHOMA NU-CP	68807	137	27.0	14.6	41.6	2861
OKLAHOMA NU-NCP	1441374	461	29.6	29.2	58.8	84686
OREGON						
EUGENE OR	139255	129	26.9	29.2	56.1	7814
PORTLAND OR-WA	751756	23	26.2	29.2	55.4	41635
SALEM OR	93041	37	26.3	29.2	55.5	5161
OREGON NU	1107311	324	28.4	29.2	57.6	63779

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
PENNSYLVANIA						
ALLEN-BETH PA	338316	78	26.6	29.2	55.8	18863
ALTOONA PA	81795	360	28.7	29.2	57.9	4735
ERIE PA	175263	209	27.5	29.2	56.7	9938
HARRISBURG PA	240751	111	26.8	29.2	56.0	13480
JOHNSTOWN PA	96146	361	28.7	29.2	57.9	5567
LANCASTER PA	117097	108	26.8	29.2	56.0	6554
PHILADEL PA-NJ	3277021	14	26.1	27.2	53.3	174778
PITTSBURG PA	1846042	232	27.7	33.3	61.0	112554
READING PA	167932	81	26.6	29.2	55.8	9367
SCRANTON PA	204205	221	27.6	29.2	56.8	11598
TRENTON PA-NJ	31475	11	26.1	26.8	52.9	1666
WILKES BARRE PA	222830	195	27.4	29.2	56.6	12612
YORK PA	123106	113	26.8	29.2	56.0	6894
PENN NU	4871930	229	27.7	14.6	42.3	205885
RHODE ISLAND						
FALL RIV RI-MA	15901	12	26.1	29.2	55.3	879
PRO'DENCE RI-MA	729337	24	26.2	26.8	53.0	38671
RHODE ID NU	204485	61	26.5	29.2	55.6	11378
SOUTH CAROLINA						
AUGUSTA SC-GA	22183	44	26.3	27.4	53.7	1192
CHARLESTON SC	228399	3	26.1	14.6	40.7	9285
COLUMBIA SC	241781	79	26.6	43.7	70.3	16996
GREENVILLE SC	157073	294	28.2	14.6	42.8	6718
S CAROL NU-CP	818823	30	26.2	14.6	40.8	33441
S CAROL NU-NCP	1122257	209	27.5	29.2	56.7	63637
SOUTH DAKOTA						
SIOUX CY SD-IA	860	338	28.5	29.2	57.7	50
SIOUX FALLS SD	75146	425	29.3	29.2	58.4	4392
S DAKOTA NU	590251	603	30.9	29.2	60.1	35462
TENNESSEE						
CHATTA TN-GA	194633	206	27.5	29.2	56.7	11032
KNOXVILLE TN	190502	271	28.0	38.4	66.4	12648
MEMPHIS TN	655045	84	26.6	14.6	41.2	26993
NASHVILLE TN	448444	137	27.0	29.2	56.2	25192
TENN NU-CP	556808	91	26.7	14.6	41.3	22974
TENN NU-NCP	1878732	313	28.3	29.2	57.5	108039

NU-Non-Urban CP-Coastal Plain NCP-Not Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
TEXAS						
ABILENE TX	90571	530	30.2	29.2	59.4	5378
AMARILLO TX	127010	1120	37.3	29.2	66.5	8441
AUSTIN TX	264499	168	27.2	14.6	41.8	11058
BEAUMONT TX	116350	7	26.1	14.6	40.7	4733
BROWNSVILLE TX	52627	13	26.1	14.6	40.7	2143
BRYAN TX	51395	110	26.8	14.6	41.4	2127
CORPUS CHRIS TX	212820	11	26.1	14.6	40.7	8663
DALLAS TX	1338684	156	27.1	14.6	41.7	55852
EL PASO TX	337471	1147	37.7	29.2	66.9	22563
FT WORTH TX	676944	204	27.5	29.2	56.7	38361
GALVESTON TX	61809	6	26.1	12.6	38.7	2391
HARLINGEN TX	50469	11	26.1	14.6	40.7	2054
HOUSTON TX	1677863	17	26.2	12.6	38.8	65039
LAREDO TX	70197	128	26.9	14.6	41.5	2915
LUBBOCK TX	150135	988	35.4	29.2	64.6	9691
MCALLEN TX	91141	129	26.9	14.6	41.5	3785
MIDLAND TX	60371	847	33.6	29.2	62.7	3788
ODESSA TX	81645	881	34.0	29.2	63.2	5157
PT ARTHUR TX	116474	3	26.1	14.6	40.7	4735
SAN ANGELO TX	63884	563	30.5	29.2	59.7	3814
SAN ANTONIO TX	772513	214	27.6	14.6	42.1	32559
SHERMAN TX	55343	219	27.6	14.6	42.2	2335
TEXARKANA TX-AR	36888	102	26.7	14.6	41.3	1525
TEXAS CITY TX	84054	6	26.1	14.6	40.7	3419
TYLER TX	59781	166	27.2	14.6	41.8	2499
WACO TX	118843	130	26.9	14.6	41.5	4936
WICHITA FALL TX	97564	288	28.1	29.2	57.3	5592
TEXAS NU-CP	2972390	76	26.6	14.6	41.2	122326
TEXAS NU-NCP	1306995	728	32.2	29.2	61.4	80225
UTAH						
OGDEN UT	149727	1311	40.4	29.2	69.6	10420
PROVO UT	104110	1387	41.8	29.2	71.0	7392
SALT LAKE CY UT	479342	1298	40.2	29.2	69.4	33256
UTAH NU	326094	1533	44.8	29.2	74.0	24118
VERMONT						
VERMONT NU	444732	180	27.1	29.2	56.5	25122

NU-Non-Urban CP-Coastal Plain NCP-Hot Coastal Plain

Table A-2. Average Dose Equivalents from Terrestrial and Cosmic Radiation (Continued)
(Corrected for Shielding)

Location	1970 Population	Elevation (meters)	Dose Equivalent (mrem/y)			Population Dose Equivalent (person-rem)
			Cosmic	Terrestrial	Total	
VIRGINIA						
LYNCHBURG VA	70842	198	27.4	29.2	56.6	4011
NEWPORT NEWS VA	268263	6	26.1	12.5	38.6	10345
NORFOLK VA	668259	4	26.1	12.5	38.5	25759
PETERSBURG VA	100617	23	26.2	14.6	40.8	4104
RICHMOND VA	416563	46	26.4	14.6	40.9	17056
ROANOKE VA	156621	289	28.1	29.2	57.3	8977
WASH DC(VA)	715841	46	26.4	22.7	49.0	35082
VIRGINIA NU-CP	556040	30	26.2	14.6	40.8	22709
VIRGINIA NU-NCP	1695448	370	28.8	29.2	58.0	98291
WASHINGTON						
PORTLAND WA-OR	73170	23	26.2	29.2	55.4	4052
SEATTLE WA	1238107	38	26.3	29.2	55.5	68695
SPOKANE WA	229620	360	28.7	29.2	57.9	13292
TACOMA WA	332521	76	26.6	29.2	55.7	18537
WASHINGTON NU	1535751	176	27.3	29.2	56.5	86706
WEST VIRGINIA						
CHARLESTON WV	157662	183	27.3	29.2	56.5	8910
HUNT WV-KY-OH	85017	172	27.2	29.2	56.4	4798
STEUBENVL WV-OH	37230	218	27.6	38.7	66.3	2469
WHEELING WV-OH	60705	198	27.4	44.1	71.5	4343
WEST VA NU	1403623	433	29.3	29.2	58.5	82126
WISCONSIN						
APPLETON WI	129532	219	27.6	29.2	56.8	7355
DULUTH WI-MN	32713	186	27.3	29.2	56.5	1849
GREEN BAY WI	129105	180	27.3	29.2	56.5	7293
KENOSHA WI	84262	186	27.3	29.2	56.5	4764
LA CROSSE WI-MN	60231	198	27.4	29.2	56.6	3410
MADISON WI	205457	262	27.9	29.2	57.1	11733
MILWAUKEE WI	1252457	186	27.3	29.2	56.5	70804
OSHKOSH WI	55480	229	27.7	29.2	56.9	3154
RACINE WI	117408	192	27.4	29.2	56.6	6643
WISCONSIN NU	2351288	295	28.2	29.2	57.4	134883
WYOMING						
WYOMING NU	332416	1768	50.4	29.2	79.6	26446

NU=Non-Urban CP=Coastal Plain NCP=Not Coastal Plain

Appendix B

Corrections to OAI/SIL 72-1

Appendix B

Corrections to ORP/SID 72-1

Three errors were noted in the histograms of figure 13 of Oakley's report (Oa72). One of these was misplacement of the vertical axis for Rocky Flats-Denver (Fig 13q). This axis was misplaced one scale division to the left. The first noticeable non-zero readings should be in the range 2 to 4 microrems/hour, the mode should be in the range 8-10 microrems/hour, and the arrow should be located at 10.4 microrems/hour.

The other two errors were in the placement of the arrows indicating the mean values for Cincinnati, Ohio, (Fig. 13m) and Los Angeles, California (Fig 13y). For the convenience of the reader, the location of the mean values for the 25 histograms of Figure 13 in (Oa72) are given as Table B-1:

Table B-1

Average Terrestrial Dose Equivalent Values for Measured Sites (Oa72)

Location	microrems/ hour	Location	microrems/ hour
No. New England	5.33	Cincinnati, Ohio	4.05
So. New England	6.11	Chicago, Ill.	5.18
Camden/Philadelphia	2.70	Minneapolis, Minn.	4.21
Fort Belvoir, Va./D.C.	4.12	Galveston, Texas	2.26
Norfolk, Va.	3.09	Rocky Flats-Denver, Colo.	10.23
Parr, S.C.	3.76	Albuquerque, N.M,	7.34
Sav. Riv/Augusta, Ga.	3.89	Carlsbad N.M.	2.93
Cape Kennedy-Orlando, Fla.	1.51	NRTS-Idaho Falls, Idaho	6.35
Ga. Nuclear Lab-Atlanta, Ga.	6.61	Las Vegas, Nevada	5.35
Oak Ridge, Pa.	5.95	Hanford- Richland, Wash.	5.87
Pittsburgh, Pa.	5.48	San Franciso, Calif.	4.78
Columbus, Ohio	5.78	Arguello-Santa Barbara, Calif.	5.44
		Los Angeles, Calif.	6.00